

REMARKS

Pending Claims

Claims 20, 25, 30 and 31 have been amended. Applicants have added new claims 32 and 33. Accordingly, claims 20-33 are currently pending.

Claim Objections

Applicants appreciate the examination of claims 30 and 31. These claims have been amended to respectively depend from claims 23 and 28.

35 U.S.C. §103

Claims 20-24 and 30 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ulmer et al (Ulmer) in view of Collins et al (Collins) and Hirai et al, U.S. Patent No. 5,481,632 (Hirai). Further, claims 25-29 and 31 are rejected as being unpatentable over Ulmer in view of Hirai under 35 U.S.C. §103(a). Reconsideration of the rejections is requested for the following reasons.

Independent claims 20 and 25 are directed to an optical communication apparatus and an optical module, respectively.

Each of these claims has been amended to set forth that the optical device and the optical fiber are mounted on a non-metal substrate. Support for the amendment is provide in the specification from page 37, line 24 to page 38, line 7 for example, which states that the substrate 30 may be a silicon crystal substrate. Further each of these claims has been amended to include a lead frame that is electrically coupled to the optical device. The support for the lead frame 50 is provided in the disclosure on page 40, line 25 through page 41, line 16 of the specification with reference to Fig. 1, for example. Accordingly, the amendments to claims 20 and 25 are supported by the application as originally filed.

According to the present invention, the non-metal substrate on which the optical device and the optical fiber are mounted ensures alignment and prevents shifting in relative position that can result from thermal expansion, strain, etc. Further, the transparent silicon resin that is filled between a face of the optical device and the end of the optical fiber prevents the deterioration of the optical device and the fiber caused by moisture absorption. Additionally, as a result of mounting the optical device and the optical fiber

on the non-metal substrate, a secure bond can be maintained while using the silicon resin, which is elastic and durable instead of being rigid and inflexible.

The Examiner recognizes that Ulmer does not disclose the transparent silicon resin claimed by applicants that is filled between a face of the optical device and the end of the optical fiber. Further, with respect to the amendments made to claims 20 and 25, Ulmer does not disclose the non-metal substrate, but rather discloses a carrier strip or lead frame 2, which is a metal body and therefore subject to thermal expansion, etc.. To distinguish the substrate of the present invention from a lead frame like that disclosed by Ulmer, Applicants have included a lead frame in the claimed combination of the independent claims. Accordingly, the differences between the invention as claimed and Ulmer are the transparent silicon resin that is filled between a face of the optical device and the end of the optical fiber and the non-metal substrate on which the optical device and the optical fiber are mounted.

Collins is relied upon for disclosing a communication processing unit. However, the combination of Ulmer and

Collins does not make up for the deficiencies in Ulmer with respect to the non-metal substrate and transparent silicon resin that are claimed by Applicants.

Hirai is relied upon for disclosing an optical junction comprising a silicon resin filled between abutting end faces of an optical wave guide unit. However, Hirai does not disclose the optical communication apparatus having a lead frame and a non-metal substrate on which the optical device and optical fiber are mounted. Accordingly, Hirai does not make up for the deficiencies in Ulmer and Collins, and therefore claims 20-24 and 30 are patentable over the combination of Ulmer, Collins and Hirai.

With respect to claims 25-29 and 31, the combination of Ulmer and Hirai does not render obvious claim 25 for the aforementioned reasons. Mainly, claim 25 includes a lead frame and a non-metal substrate in the claimed combination, which is not disclosed by Ulmer and Hirai. Accordingly, claims 25-29 and 31 should be found to be allowable over Ulmer and Hirai.

New claims 32 and 33 are supported by the specification, as pointed out with respect to the amendments made to the

independent claims that set forth that the substrate is a non-metal substrate. See page 37, line 24 to page 38, line 7 of the specification, for example, which states that the substrate 30 may be a silicon crystal substrate. Claims 32 and 33 are patentable over the art of record at least for being dependent from independent claims that are asserted to be allowable for the foregoing reasons.

Conclusion

Applicants request entry of the foregoing amendments and of the new claims 32 and 33. The amendments have been presented in view of the newly cited reference to Hirai. New claims 32 and 33 have been added to provide dependent claims that further define the material of the non-metal substrate, and are therefore related to the amendments made to the independent claims.

In view of the foregoing amendments and remarks,
reconsideration and reexamination are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "John R. Mattingly", with a stylized flourish at the end.

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